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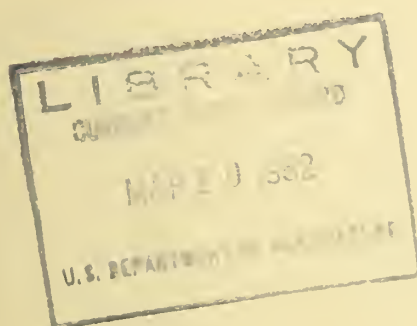


FOREIGN AGRICULTURE REPORT

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COTTON PRODUCTION IN MEXICO RECENT DEVELOPMENTS



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FOREWORD

In the years since World War II the neighboring republic of Mexico has developed rapidly as a producer of cotton.

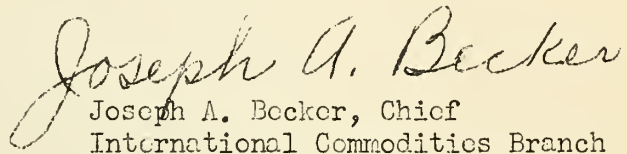
Next to the United States, Mexico is now the largest exporter of cotton in the Western Hemisphere.

American cotton growers are naturally interested in these developments. P. K. Norris of this Office went to Mexico recently to observe the situation at first hand. This is his report.

In line with the provisions of the Research and Marketing Act of 1946, the Office of Foreign Agricultural Relations has followed closely the production and demand for cotton in other countries of the world. Studies have been made since the War in Europe, the Middle East, South America, and parts of Africa.

Similar studies for other agricultural commodities are being made by this Office.

The findings are presented in other reports and circulars which may be obtained free from the Office of Foreign Agricultural Relations, United States Department of Agriculture, Washington 25, D. C.


Joseph A. Becker, Chief
International Commodities Branch

ACKNOWLEDGMENTS

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CONTENTS

	Page
General description of cotton-growing districts.....	2
Matamoros district.....	6
Laguna district.....	8
Mexicali district.....	10
Chihuahua region.....	12
West coast districts.....	13
Don Martin district.....	15
New and scattered districts.....	16
Conclusion and outlook.....	17

COTTON PRODUCTION IN MEXICO--RECENT DEVELOPMENTS

by

P. K. Norris

Mexico's 1951-52 cotton crop is the largest in the country's history--an estimated 1,250,000 bales. For several years, cotton production has been increasing in Mexico. Before the war the rise was rather gradual but since then it has been at an accelerated rate. From an average of about 265,000 bales in the 1930's, output rose to around 375,000 bales at the outbreak of the last war. During the war, production averaged about 450,000 bales a year, but after the war and especially since 1948-49 it has increased rapidly. The 1948-49 crop was 570,000 bales. The following year it was 937,000 bales and last year, 1,120,000.

Yields are relatively low, averaging about half a bale per acre. In certain districts, they have been improved somewhat in recent years, but the national average has changed little. The improvements seem to have been offset by the lower yields of marginal land that has been planted during the past 2 or 3 years.

In 1948-49 the total area planted to cotton was 1,050,000 acres. The next year the acreage increased to 1,446,000 and in 1950-51 to 1,804,000. The 1951-52 area is estimated at 2,015,000 acres.

Table 1. - Mexican cotton: Area, production, and yield, 1930-31 to 1951-52

Crop Season:	Area	Production	Yield:	Crop Season:	Area	Production	Yield:
		1/	per			1/	per
	acres	bales	acre		acres	bales	acre
			pounds				pounds
1930-31....	390	178	218	1941-42....	781	375	230
1931-32....	319	210	315	1942-43....	895	458	245
1932-33....	192	102	254	1943-44....	1,010	515	244
1933-34....	424	260	293	1944-45....	963	472	234
1934-35....	418	223	255	1945-46....	904	434	229
1935-36....	657	315	229	1946-47....	843	460	262
1936-37....	847	397	224	1947-48....	927	484	251
1937-38....	830	341	196	1948-49....	1,050	570	261
1938-39....	642	307	229	1949-50....	1,446	937	311
1939-40....	648	312	230	1950-51....	1,804	1,120	298
1940-41....	627	302	230	1951-52 2/	2,015	1,250	298

1/ Bales of 480 pounds net.

2/ Estimated.

Sources: OTHR files, data compiled from the Ministry of Agriculture, Foreign Service Reports, and private agencies.

Mexican cotton is similar to United States cotton in most respects. It is grown from seed of United States varieties and is ginned and handled exactly as the crop in the United States. The bales are the same size, shape, and density and are covered with the same type of bagging. Because of this similarity, Mexican cotton for years lost its identity when exported; it was sold as United States cotton. In recent years it has been sold in a number of foreign markets as Mexican cotton. In some cases it has been offered at prices under that of United States cotton of comparable grade and staple.

General Description of Cotton-Growing Districts

The northern third of Mexico is a semidesert. With the exception of a relatively small area along the east coast of the country, crop production throughout this vast region is confined to widely scattered districts where the soil is fertile and irrigation water is available. From a practical standpoint, these districts constitute oases in a desert.

The soil of most of the districts is of alluvial origin and reasonably fertile. Many of the districts are located in river valleys, deltas, or old lake beds. Because of the sandy and rocky soils and the rolling and mountainous nature of the surrounding country, much of northern Mexico is of little or no agricultural value and would not be useful even if water was available. The region is transversed by a number of rivers and creeks that are dry most of the year but often rise to flood stage during the short rainy season. Many of the rivers never reach the sea but pour their water over a delta or into old lake bottoms. These districts comprise the most important agricultural areas of northern Mexico.

In general the climatic factors other than rainfall are favorable for cotton production. The growing season is longer than that of most of the United States Cotton Belt. Frost or cold weather are of no significance. Except in a small area in the northeast, rainfall is not sufficient to mature a cotton crop. The rainfall varies from practically nothing to 12 to 20 inches a year and it is not uncommon for as much as 2 to 6 inches to fall in a few hours.

Although the cotton-growing districts are scattered over a vast area, the transportation problem is not a limiting factor. Railroads connect the most important districts with the textile centers to the south or the seaports on the east or west coast and in the United States. Nearly all of the export cotton moves through the ports of the United States and most of that destined for Canada is shipped by rail through the United States. Roads and highways within the cotton-growing area are largely dirt, graded or ungraded, but adequate. Modern highways extend south from Nuevo Laredo through Monterrey and Ciudad Victoria to Mexico City, from Matamoros to Ciudad Victoria, and from Piedras Negras to Saltillo. An important highway south from Ciudad Juarez serves several of the new cotton districts in the State of Chihuahua.

The districts along the west coast are connected by a road south of Nogales through Hermosillo and the Pacific port of Guaymas. An east-west highway extends from Matamoros to Lurango. It connects Reynosa, Monterrey, and Torreon - all important cotton-ginning points. While it is possible to reach most of the cotton-growing districts by motor car or truck, it is not always advisable to do so. The railroad, although slow, is still the most practicable transportation between many of the cotton-growing districts and other parts of the country.

The supply of farm labor in the cotton-growing districts seems to be adequate. Large numbers of laborers from south and central Mexico come north each year. Many of these people hope to cross into the United States where wages are higher than in Mexico. If for any reason they are not able to enter the United States, they may stay and do farm work on the Mexican side.

As a general rule the transient Mexican laborer is not an experienced cotton-farm worker. He may be a farmer but he has had little or no experience handling cotton production machinery or doing the hand work required to chop or pick the crop. However, this is not as common now as a few years ago. Today laborers on Mexican farms are handling plows, tractors, and other farm equipment. Many of them are as well-trained in the use of modern farm machinery as farmers in the United States.

Farm wages are low compared with wages paid on United States cotton farms. Wages for common day labor in Mexico range from 8 to 12 pesos (US\$0.92 to US\$1.38) per day, while the more skilled laborers such as tractor operators can be had for 12 to 18 pesos (US\$1.38 to US\$2.07) per day.

The cultural methods of the farmer, as well as the efficiency of the laborer, have improved and are still improving. In the larger cotton districts where a few years ago the old primitive methods of plowing, planting, and cultivating were followed to a large extent, a change or shift in operation has occurred. A few years ago, only a few of the larger farms used tractors and power machinery. Today, farmers who plant less than 100 acres can hire power equipment for a part of their operation, and those who farm 100 acres or more can own their equipment. The widespread use of power equipment on the cotton farms in the chief cotton-growing districts is one of the most significant developments of recent years.

With ample credit available, farmers have purchased tractors, plows, and pump equipment that they would never have been able to own had they been required to pay cash. Local banks and other financing agencies have thus encouraged the development of power farming.

With power equipment, farmers can live in cities and towns and drive to their farms daily to supervise their hired labor. Literally dozens of them are doing this.

United States farm machinery equipment firms are represented throughout the cotton-growing districts. Hundreds of tractors, plows, cultivators, and other equipment have been sold in the Mexican cotton districts in recent years. The principal United States manufacturers have agents in the leading towns of the cotton-growing areas. These agents are so active and credit is so plentiful that there is hardly a Mexican farmer with holdings large enough to justify buying a tractor who could not buy one if he so desired.

Closely related to the growing use of power equipment is the increased use of fertilizer and insecticides. A few years ago little or no attention was given to the question of soil fertility. The soil of most of the districts would produce a crop if the water was available. In recent years, however, the use of fertilizers has been studied and their value is being demonstrated throughout several cotton districts. Although fertilizers are not yet universally used, they may be one of the best means of increasing yields.

The same is true of insecticides. About all the known major cotton insects are prevalent in Mexico except in two or three districts. These insects take a heavy toll each year. Mexican cotton growers keep up with the research work in insect control done in the United States and as new types of insecticides are developed, they are used just as rapidly in Mexico as in the United States.

For several years the United States Department of Agriculture has cooperated with the Mexican Government in the eradication and control of the pink bollworm and other insects in the districts along the border. The primary object from the United States viewpoint is to control the insects at their source and thus to prevent their spread to the Cotton Belt of the United States. This has proved profitable for both countries and has resulted in a great deal of the technical information developed in the United States being used in Mexico.

Theoretically, there are no large landowners in the cotton-growing districts of Mexico. The laws of the country prohibit the ownership in excess of a definite acreage, usually from 250 to 350 acres per person. However, there are a number of large operators who cultivate the land held in the names of relatives or others. This practice gives them control of considerably more land than they are allowed by law to own. While the use of farm power equipment has tended to increase the number of large operators in the important cotton districts, a large part of the crop is still produced on what are, in fact, small holdings, many of them much smaller than the maximum permitted by law.

Much of the cotton land is included in the "ejidos," which are cooperatively operated farms. The members ("ejiditarios") may work the land collectively or individually, but they are under official supervision and their business is largely handled by a government-operated bank ("ejido bank"). These organizations were set up as a result of the agrarian reforms initiated to give land to the peons. There is a good deal of comment regarding this type of organization but regardless of its merits or demerits it seems that the members of the organization are satisfied. Over the years they have been willing to go along with the organization. Of course, a good deal of adjustment has been made from time to time.

In addition to the "ejiditarios," there are a large number of "pequenos propietarios," small landholders. These men operate very much as small owners in the United States. They borrow money, handle their own affairs, and are important factors in the farm communities.

Practically every Mexican cotton grower---big or little---operates on borrowed money. The finances are provided by local banks, Government banks, and private companies. The cotton ginning companies are most active in this field and, of course, are engaged in buying cotton from the farmer. Money is loaned for the purchase of farming equipment, payment of labor, and the purchase of insecticides and fertilizers. Farmers usually make arrangements with the finance organization for a definite amount, to be paid at fixed intervals throughout the growing season. The rate of interest is considerably above the rate prevailing in the United States Cotton Belt. Some of the larger financing companies employ field men who furnish a great deal of technical information and are otherwise helpful to borrowers. Some of these organizations conduct experiments or demonstrations in the use of fertilizers, insecticides, and higher-yielding varieties.

Domestic cotton consumption has been in the neighborhood of 300,000 bales annually. While complete data are not available, it would appear that during the last 3 years some 500,000 to 700,000 bales a year have been available for export. Most of this cotton has been shipped from United States ports and sold in the large European markets where until a few years ago the bulk of the cotton consumed was United States. Japan and Canada also have become important markets for Mexican cotton, in recent years. Several large United States firms are engaged in exporting Mexican cotton under the same conditions as United States cotton. They sell it to spinners who a few years ago were using only American cotton. During the past 2 or 3 years, Japan, the United Kingdom, Belgium, Italy, Switzerland, France, Canada, Sweden, Spain, and the Netherlands have imported most of Mexico's cotton surplus. Because of the abnormal price and export situation of the past year, it is difficult to measure the influence of Mexican cotton in export markets, but the fact that it is now accepted in the leading world markets would indicate that under normal conditions it will maintain a place in these markets.

Such data as are available on cost of production indicate that cotton is grown in Mexico at a figure considerably lower than in the United States. In years of active demand, both Mexican and United States cotton may sell abroad at about the same price, but in seasons of slack demand Mexican could undersell United States cotton in the export market.

Table 2. - Mexican cotton: Average production, 1943-44 to 1945-46 and 1951-52, by districts

District or region	Production 1/	
	Average	1951-52 2/
	1943-44 to 1945-46	
	1,000 <u>bales</u>	1,000 <u>bales</u>
Matamoros.....	80	280
Laguna.....	219	306
Mexicali.....	74	254
Chihuahua.....	53	173
West Coast.....	28	171
Don Martin.....	13	25
New and scattered.....	7	41
Total.....	474	1,250

1/ Bales of 480 pounds net.

2/ Estimated.

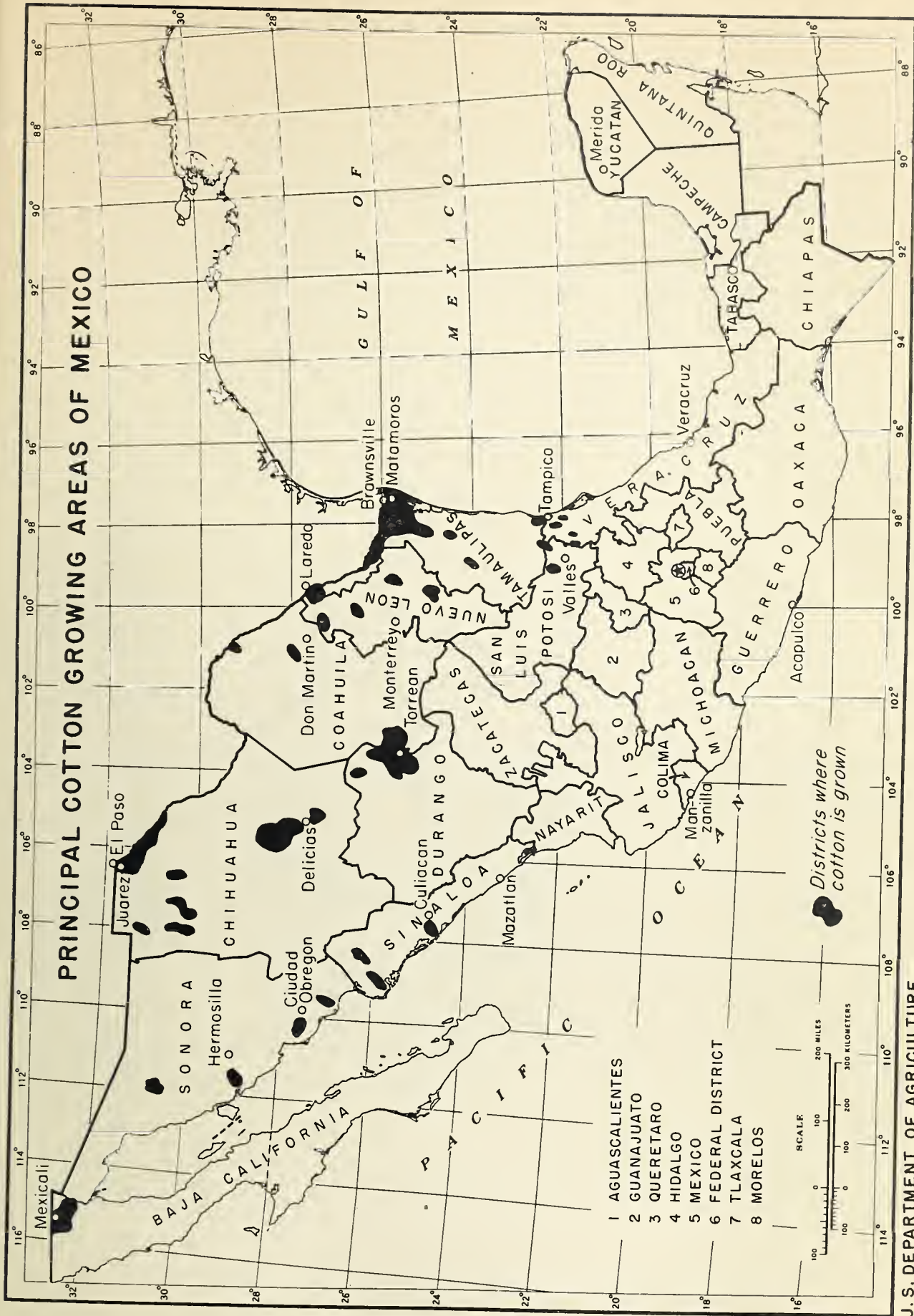
Sources: OFAR files, data compiled from the Ministry of Agriculture, Foreign Service Reports, and private agencies.

Matamoros District

The Matamoros cotton-growing district takes its name from the city of the same name. The city of Matamoros, located across the Rio Grande from Brownsville, Texas, is one of the oldest settlements in north Mexico. Its growth and development in recent years is due to the expansion of cotton production in its trade territory.

The District includes a triangular-shaped area extending some 70 miles south and 100 miles west of the city. The boundaries are fixed by the extent to which the gravity-flow irrigation water is available. Some cotton is grown by rainfall but this is a hazardous undertaking and considerable loss occurred in those areas this year from extreme drought conditions. Most of the crop depends on irrigation.

PRINCIPAL COTTON GROWING AREAS OF MEXICO



Matamoros is one of the oldest cotton districts of Mexico but until recently it was second or third in importance. Today, of the three large districts, it stands first in acreage and production. Its rise has been rapid and is the result of the expansion in irrigation facilities and acreage since 1948-49. In 1948-49 the planted area was about 395,000 acres, from which a crop of 140,000 bales was harvested. The following year, the area planted was 618,000 acres and the crop reached 316,000 bales. The 1950-51 area was 790,000 acres and the production was a record crop of 357,000 bales. The 1951-52 planted area was estimated at 1,000,000 acres but due to dry weather and the failure to develop expected irrigation facilities, the acreage to be harvested was recently estimated at only 742,000 acres with production not expected to exceed 280,000 bales.

At present the Matamoros district depends on water supplied by a system of canals fed from a lake on the San Juan River, a gravity-flow canal system fed by the Rio Grande, and a number of small pump stations along the banks of the Rio Grande. The Rio Grande canal system includes two reservoirs or lakes that are filled from the river by gravity-flow. These lakes store water for use when the water level in the river is low. The lake formed by a dam on the San Juan River has been low for almost a year and as a result the area depending on the lake has been short of water. During a normal season a cotton farmer can expect two or three waterings to supplement the scanty rainfall, but 1951 has not been a normal season. Farmers anticipating water by May, 1951 from the Rio Grande through a new canal under construction, planted hundreds of acres but the canal was not completed. It will probably not be completed before January 1, 1952. Over much of the area to be watered by this canal, the annual rainfall is about 10 inches or less. Cotton planted on such land will not make a crop without irrigation.

In addition to the canal, the Mexican Government is now building, with the cooperation of the United States, a large dam on the Rio Grande. When this dam is completed it will remove much of the present hazard of short water supply and allow new areas to be brought under cultivation.

There is a great deal of enthusiasm regarding the future of cotton production in the Matamoros district. Reports as to increased irrigation facilities and increased acreage are heard on all sides. Officers, businessmen, and informed farmers are frank in their statements as to what they expect in the next few years. Land that may be brought under water is now being cleared. Money for this and for the purchase of all kinds of farm machinery is being advanced by cotton-buying firms and banks. Gins are being built in the new area. Much of the present development gives the appearance of a "boom." Today it is a simple matter to get money for land development. If the water becomes available as expected, a large area will be opened.

The policy of the Government seems to be one of "stretch the water" supply. The expansion of irrigation works is planned on the basis of about three waterings a year. This leaves the farmer to depend on rain for about

half of the required moisture. Under this system the crop may never get all the water needed but will yield something. Such a policy will enable the Government to supply some water to a large number of farmers. This means more cotton, since cotton is about the most drought-resistant crop a farmer can grow. It is also a cash crop and can be financed. In fact, growers who operate under such a policy may find themselves in need of financial help most of the time.

This type of policy may make this district one of the leading agricultural areas of Mexico. By the "stretch the water" policy, cotton growing will always be a hazardous kind of business, but over the years it will give a better return than can be made in some of the other areas where there is no irrigation water. There will always be men, both farmers and bankers, who are ready to take the risk. In a few years it will become more or less evident where the crop can be grown with the least risk and those areas will be cultivated. Other areas will go back to "brush." A lot of what is now enthusiasm will pass and the dependable men and areas will become known. The long-time outlook depends on the amount and use of the water.

Table 3.- Matamoros district: Cotton area, production, and yield, 1947-48 to 1951-52

Crop season	Area	Production ^{1/}	Yield per acre
	<u>1,000 acres</u>	<u>1,000 bales</u>	<u>pounds</u>
1947-48.....	309	109	169
1948-49.....	395	140	170
1949-50.....	618	316	245
1950-51.....	790	357	217
1951-52 ^{2/}	742	280	181

^{1/} Bales of 480 pounds net.

^{2/} Estimated.

Sources: CFAR files, data compiled from the Ministry of Agriculture, Foreign Service Reports, and private agencies.

Laguna District

The Laguna district, lying about 225 miles west of Monterrey, takes its name from the fact that it is an old lake bed, which was formed by soil washed into an ancient lake by the Nazas River. The cultivable area is said to contain approximately 500,000 acres. The district is surrounded by a semiarid country. The rainfall is so light that irrigation is necessary to grow any kind of row crop.

The water is supplied by the Nazas River, which rises in the mountains to the north and west. Originally the water was delivered in flash floods as the rains fell in the highlands. Today, the water is held in storage by a dam about 75 miles to the northwest and is fed to the area as required. The control of the water has not been as successful as was expected, chiefly because the supply has not been sufficient to build up the required backlog of water in the lake behind the dam. Once the lake is filled, the water supply should be more uniform.

For years the Laguna was the leading cotton-growing district of Mexico. It is still one of the three big districts but has in recent years been surpassed by the Matamoros district. Production has been increasing rather steadily during the last 3 or 4 years. From a crop of 173,000 bales in 1947-48 it rose to 295,000 bales in 1950-51. The 1951-52 crop is estimated at about 306,000 bales. While some expansion of acreage has occurred in recent years it has not been as large as in other districts.

Because of a year-round water supply the Laguna has a diversified type of agriculture. In addition to cotton, this district produces wheat, alfalfa, corn, and other crops common to the southwest. It has what is probably the best balanced cropping system of all the cotton-growing districts of Mexico. Over the years the Laguna has had the highest yields per acre in the country. In recent years they have averaged more than 500 pounds, about twice those of the other districts. The relatively high acre yields are due in part to the cropping system followed.

Expansion of cotton acreage in the Laguna has been moderate in recent years. Some new land along the east side has been brought under irrigation by drilling wells but on the whole the "cotton boom" is not so noticeable in the Laguna as in some of the other districts. However, more land in the older cultivated area will be planted to cotton if the "cotton boom" lasts. The cost of bringing in new land is so high that it will not become a common practice. Wells, canals, and ditches are so expensive and require so much capital that only a limited amount of new land will be brought under cultivation in the near future.

Table 4.- The Laguna district: Cotton acreage, production, and yield, 1947-48 to 1951-52

Crop season	Area	Production ^{1/}	Yield per acre
	<u>1,000 acres</u>	<u>1,000 bales</u>	<u>pounds</u>
1947-48.....	208	173	399
1948-49.....	198	192	465
1949-50.....	213	239	539
1950-51.....	272	295	521
1951-52 ^{2/}	284	306	517

^{1/} Bales of 480 pounds net.

^{2/} Estimated.

Sources: OFAR files, data compiled from the Ministry of Agriculture, Foreign Service Reports, and private agencies.

Mexicali District

The Mexicali district, lying south of the California border, is an extension of the Imperial Valley of California. Its soil and climate are similar, and, like the Imperial Valley it depends on the Colorado River for its water supply. Under an agreement between Mexico and the United States the Mexicali district may receive up to a total of 1,700,000 acre-feet of water annually from the Colorado River. This water is supplemented by a number of wells, but in the main the river is the chief source of water. The old question of water scarcity is an ever-present problem.

The district ranks third in volume of cotton production in Mexico. During the last 5 years the crop has averaged about 153,000 bales, which is considerably less than either the Laguna or the Matamoros districts. The crop has increased rapidly from 105,000 bales in 1948-49 to about 254,000 bales in 1951-52.

The area planted to cotton this season is estimated at 383,000 acres, an increase of almost 100,000 acres over last year and about 200,000 acres over the past 5-year average.

The current price of cotton and a favorable outlook were the most important factors in the increased planting during the past season. A good deal of the acreage expansion has been on land that, under normal conditions, would never have been planted to cotton.

Yields have averaged a little better than half a bale per acre for the past 5 years. This is not high when compared with yields on irrigated land in California. There are a number of reasons for the relatively low yield; insects are perhaps the chief one. While the district is fortunate in that it has no boll weevils, it has quite an assortment of other cotton insects.

One of the most noticeable things about the Mexicali district is the change that has occurred during the last few years in the farming methods and practices. The increased use of power farm machinery and the widespread use of insecticides are outstanding examples. It is hard to realize that farm tractors have become so common in the short space of 2 or 3 years. Machinery salesmen claim that the Mexicali district is today one of the largest markets of comparable area for all kinds of farm machinery and equipment in North America. This also includes cotton-ginning equipment.

The use of insecticides has also increased, stimulated greatly by the unwillingness of most finance firms to lend money unless insecticides are used. Most of the finance firms either sell insecticides or have an arrangement whereby they buy it for borrowers. They also see that it is properly applied in the field. This is a development of the last year or two.

One of the large finance firms is now interested in the use of fertilizer and maintains an experimental farm where, along with other projects, the different types are being tested. If fertilizer proves to be profitable, its use could spread as rapidly as insecticides did a year or two ago. The bankers will require its use and, if returns are ample, farmers will adopt it regardless of cost.

Another outstanding example of the changes taking place in the Mexicali district can be found in the operating practices of many farmers. A large part of the district is farmed by "ejiditarios" and "pequenos propietarios." A few years ago these groups were not doing well. The attitude of the banks and private money-lending firms toward these groups was one of near hostility. Today, the members of both groups have improved their farming methods until they are now considered good risks and borrow money on the same basis as other farmers. They buy and operate all types of farm machinery and follow the recommendations with respect to the use of insecticides.

Future expansion of cotton growing in Mexicali will depend on the return from cotton as compared with that from other crops and on the water supply. If cotton prices remain relatively high, the acreage will increase somewhat. The total increase cannot be very great, however, because land and water are limited.

While some new land may be brought under irrigation, thus increasing the total crop of the district, and additional expansion in production may be obtained by increasing the yields per acre. Some progress has been made in this direction through better farming practices. More may be expected.

Table 5. - Mexicali district: Cotton area, production, and yield, 1947-48 to 1951-52

Crop season	Area	Production 1/	Yield per acre
	<u>1,000 acres</u>	<u>1,000 bales</u>	<u>pounds</u>
1947-48.....	175	97	266
1948-49.....	185	105	272
1949-50.....	264	154	280
1950-51.....	297	224	362
1951-52 2/.....	383	254	318

1/ Bales of 480 pounds net.

2/ Estimated.

Sources: OFAR files, data compiled from the Ministry of Agriculture, Foreign Service Reports, and private agencies.

Chihuahua Region

The most important cotton-growing districts between the Laguna and the Rio Grande are Delicias and Juarez. The Delicias district is one of the oldest in this part of Mexico. Cotton production is said to antedate that of the Laguna. In addition to these two rather large districts, there are a number of small areas or plots in the general region. Some of them are small because they are new and undeveloped, while others are small because under the present conditions they have reached the limit of their development.

The cotton acreage along the Mexican National Railroad between Torreon and Juarez is sometimes called the Delicias district but, in fact, includes more than the original Delicias district. In this general area there are a number of new developments. These developments are several miles from the old-established district but they are in a sense the product of it. Men who operated in the Laguna and Delicias districts have played a leading part in opening the new developments. They started operations by lending money, building gins, drilling wells, and building irrigation works. An example of this new development is the acreage near the town of Ceballos. The development is said to be about 10,000 acres this year, but the men responsible for it indicate that this will be enlarged next year.

Another new development is near Jimenez. This acreage is somewhat larger than Ceballos and is expected to expand next year. Several smaller plots in this general area have also been planted to cotton this year and others will be planted if and when water is available.

South of Delicias around Ciudad Camargo, quite a large acreage has been planted to cotton. This land is watered by both gravity-flow canals and wells. The canals are fed by water from rivers that rise in the hills, where the rainfall is relatively heavy. The cotton acreage is confined to a narrow belt, or valley, along the railroad. While the district appears to have plenty of water the soil is rather poor, and acre yields are low. At present some fertilizer is used but the practice is not common. It is reported that a fertilizer plant will be built shortly in the district.

The Juarez Valley across the river from the El Paso district of the United States produces some of the best cotton of Mexico. Much of it runs near 1-1/8 inches in staple length and is largely used in the country. It moves south by rail to the mills in Mexico City and Pueblo. This is one of the longest freight hauls in the country, and for that reason the Juarez farmers claim that they pay one of the highest transportation charges of any group of cotton farmers in the country.

Growers take pride in producing a good staple cotton despite the fact that the quality is often damaged by water shortage. The present water supply is by gravity-flow canals from the Rio Grande. Under the treaty with the United States, the Juarez Valley receives about 60,000 acre-feet of water a year. In years of short supply this quantity is cut relative to the supply. In the summer of 1951 the supply was so low that the Mexican farmers received only about half of the treaty supply.

Mexican farmers supplement the river flow by pumping from wells, but this practice is not as common as it is on the United States side of the Rio Grande. In addition to the well supply, farmers have developed a system of using the drainage water. This system is not new but the farmers of Juarez have developed it to a high degree. The water from the river is delivered in the usual way to the upper third of the valley. After this upper third has been watered, the drainage from the area is used in the middle of the valley; what is left is then reused in the lower part. Of course this drainage water is supplemented by well water in order to dilute it; otherwise, it would be so salty that it could not be used. From these operations it would seem that farmers are able to make irrigation water do double duty.

The acreage in cotton in this valley will not increase very much. The water is not available and it does not appear that it can be made available.

Table 6.- Chihuahua region: Cotton area, production, and yield, 1947-48 to 1951-52

Crop season	Area	Production 1/	Yield per acre
	<u>1,000 acres</u>	<u>1,000 bales</u>	<u>pounds</u>
1947-48..	128	65	244
1948-49.....	149	80	258
1949-50.....	143	125	420
1950-51.	168	104	297
1951-52 2/.....	207	173	401

1/ Bales of 480 pounds net.

2/ Estimated.

Sources: OFAR files, data compiled from the Ministry of Agriculture, Foreign Service Reports, and private agencies.

West Coast Districts

The area along the coast in the States of Sonora and Sinaloa is experiencing a real boom. Cotton is not new in this area but several new areas are being opened. Roads are being laid out, lands surveyed and cleared, wells drilled, and irrigation ditches dredged. Farmers are being settled on new lands. This in turn has increased the business activity of the towns and cities in the general area. New firms and business of all kinds are being opened. Sales offices for large United States farm machinery manufacturing companies are doing a flourishing business. New cotton gins and oil mills are being built and several of the largest cotton firms of Mexico and the United States have offices in the area.

From the standpoint of available land, there is little doubt that this area can be developed into one of the best agricultural sections of Mexico. There are thousands of acres of land on which many kinds of crops can be grown if water is available. A part of the area is now under cultivation, but it is the development or the outlook for development of new areas that is largely responsible for the present boom.

Cotton is an established crop in several of the older areas, but their production has never been important in the national total. Some of these areas are important producers of vegetables, largely for the winter market. About 1948-49 the cotton area of the west coast was less than 50,000 acres. In 1949-50 the crop increased to more than 100,000 acres and in 1950-51 to 161,000 acres. The 1951-52 acreage is estimated at 279,000 acres. Like other districts of Mexico, and for the same reason the west coast has low average yields. The 1948-49 crop was 26,000 bales. In 1949-50 the crop was 63,000 bales, the 1950-51 crop was 102,000 bales, and the 1951-52 crop is estimated at 171,000 bales. This is an average yield of a little more than half a bale per acre.

The expansion of acreage since 1948-49 indicates some of the enthusiasm in this district. Most of the increase has occurred in the new areas around Santa Ana, Altar Tinaja, and west of Lemosillo. Estimates as to the amount of available land suitable for cotton range from a few hundred thousand acres to more than a million, but regardless of the correct figure it is safe to assume that there is land for considerable expansion in the future. Most of these new areas are located in what may be called river bottoms or deltas. There are several quite large rivers, dry during most of the year. In flood season, however, these rivers have for ages spread their waters out over a large area and in doing so have built up deltas of fertile soil. The water table under these areas is said to be near enough to the surface to provide a cheap supply of irrigation water. A part of the area now in cotton is watered by gravity flow from lakes made by dams across the main river, but the bulk of the future area will have to be watered by wells. This type of development does not depend on the building of dams by the Government; it depends on individual action. And, with credit available as at present, more and more wells will be drilled.

Table 7.- West coast districts: Cotton area, production, and yield, 1947-48 to 1951-52

Crop season	Area	Production 1/	Yield per acre
	<u>1,000 acres</u>	<u>1,000 bales</u>	<u>pounds</u>
1947-48.....	40	20	240
1948-49.....	49	26	255
1949-50.....	104	63	291
1950 51.. ..	161	102	304
1951-52 2/.....	279	171	294

1/ Bales of 480 pounds net.

2/ Estimates.

Sources: OFAR files, data compiled from the Ministry of Agriculture, Foreign Service Reports, and private agencies.

Don Martin District

The Don Martin district, located about 50 miles southwest of Nuevo Laredo, is one of the smaller cotton-growing areas. Development was begun about 1932 and was reported at that time to have great possibilities. A dam built at the junction of two rivers was expected to impound enough water to irrigate 150,000 acres below the dam. The land is still available but the water has never been available. Only half of the 150,000 acres has been cultivated.

Water is short because, although the lake behind the dam has capacity enough to hold the water necessary to irrigate all the land, the lake does not fill to its capacity. It is reported that the size of the watershed was overestimated and that the lake will never be filled. Years of short rainfall on the watershed are also said to be a factor. It is also reported that a great deal of the water is lost through a subterranean drainage in the bottom of the lake. Until the water supply can be increased it is not likely that this area will increase its cotton acreage.

The current cotton crop, estimated at about 25,000 bales from a planted area of 45,000 acres, is grown largely by small farmers who use about the same tools and methods as used on similar-size farms in other areas. There are several firms and a number of the large as well as the smaller cotton firms operate in the district.

Table 8.- Don Martin district: Cotton area, production, and yield, 1947-48 to 1951-52

Crop season	Area	Production 1/	Yield per acre
	1,000 acres	1,000 bales	pounds
1947-48.....	42	17	194
1948-49.....	49	22	215
1949-50.....	42	25	206
1950-51.....	42	23	263
1951-52 2/.....	45	25	267

1/ Bales of 480 pounds net.

2/ Estimated.

Sources: OFAR files, data compiled from the Ministry of Agriculture Foreign Service Reports, and private agencies.

New and Scattered Districts

One of the most noticeable developments in the recent expansion of cotton acreage is the increase that has occurred in a number of small districts throughout northern Mexico. These districts are not important in the total production of the country, but they indicate the extent of the "cotton boom." A number of them are located in what may be called the Monterrey trade territory. They all depend on irrigation, which is supplied by damming up a small river or creek or by pumping from a well. Often the well is so small that the pump is operated by a windmill. While the potentialities of such areas are often overestimated, they have stimulated a good deal of interest in production, especially around Monterrey.

A few years ago the businessmen of Monterrey thought little about cotton. Today they are talking about "the Monterrey cotton-growing area." There are five gins and two oil mills in the city--all new and modern--of United States manufacture. Most of them are owned by men who are also engaged in other forms of business. In some cases these men have had little or no experience in the cotton business.

There are also a number of small cotton areas along the river, between the upper limits of the Matamoros district and the Ciudad Juarez district. In these areas water is pumped from the river or wells, or small reservoirs are utilized. In recent years a number of plots have also been developed in the area along the railroad between Piedras Negras and Monclova in the State of Coahuila.

Much of this small-area development seems to be the result of the rise in cotton prices. Most of the land was uncultivated, or if it was under cultivation it was planted to food or feed crops. As cotton prices rose, cotton merchants began to encourage production by extending credit to farmers who would plant cotton. Farmers who heretofore had never been able to borrow money found themselves capable of borrowing if they would plant cotton. As the number of cotton farmers increased, new gins were built and, in order to keep the gins supplied with seed cotton, credit was extended to still more farmers. In a number of cases, loans have been made for drilling new wells or building small reservoirs. Farmers have been quick to take advantage of credit. As a result, there are dozens of few-acre plots located in creek bottoms, surrounded by semidesert country, scattered throughout northern Mexico.

There are no doubt a number of such plots still undeveloped in this general area but on the whole this type of expansion will not add greatly to the national total.

Another new development is the expansion of cotton production between Tampico and San Luis Potosi. This area is about 300 to 325 miles south of Monterrey and seems to be concentrated around the towns of Valles and Rio Verde. While some cotton has been grown here for many years, its production is still more or less in the experimental stage. The area is

far enough south to make a difference in the growing season. At present some of this area produces what might be called a winter crop. The seed is planted in October or November and picked in April or May. It is reported that for the last year or two a number of bales have been picked as early as January.

The rainfall is an important factor. Along the coast it averages better than 45 inches a year, with good distribution. The heavy-rain months are from May to December. To the west the elevation increases and the rainfall decreases. The town of Rio Verde, with an elevation of about 4,000 feet, has a rainfall of about 20 inches, while to the west at San Luis Potosi the elevation is about 6,000 feet and the rainfall less than 12 inches. The rainfall at Rio Verde is distributed over the growing season from May to October, while at San Luis Potosi most of the rain falls during July, August, and September. The elevation of the towns do not give a true picture of the topography of the area, because the crop is grown in valleys much lower than the recorded elevation.

One problem of the experimental work in this south area is determining the most suitable planting date. The area is far enough south to allow planting most any month in the year. A number of other problems--selection of suitable varieties, transportation, and, in the area where the rainfall is supplemented by irrigation, a water supply--will have to be solved before this area will become an important part of the Mexican cotton area.

Table 9.- New and scattered districts: Cotton area, production, and yield, 1947-48 to 1951-52

Crop season	Area	Production 1/	Yield per acre
	1,000 acres	1,000 bales	pounds
1947-48.....	25	3	58
1948-49.....	25	5	96
1949-50.....	62	15	116
1950-51.....	74	15	97
1951-52 2/.....	75	41	262

1/ Bales of 480 pounds net.

2/ Estimated.

Sources: OFIR files, data compiled from the Ministry of Agriculture, Foreign Service Reports, and private agencies.

Conclusion and Outlook

For many years, Mexico has been gradually expanding its cotton production. The increase of the last 3 or 4 years, however, has assumed the proportions of a "boom." The availability and use of credit have enabled

hundreds of farmers, who a few years ago produced no cotton, to develop into cotton growers. Credit has also made it possible for experienced cotton farmers to utilize power equipment in the cultivation of cotton. The use of power machinery has encouraged and will continue to encourage individuals to operate larger units of land. In most of the places where cotton is grown the legal limit of individual land ownership is 100 hectares, approximately 247 acres. Several holdings of this size belonging to members of the same family are often handled by a single operator. The law regulating the maximum amount of land that may be owned by an individual does not seem to prevent an individual's controlling (usually through power of attorney) large areas. As long as credit is available, this type of operation will continue and the tendency will be to increase rather than to decrease the amount of land handled by large operators.

While the best areas of northern Mexico are now producing cotton, there is still considerable land that could be brought under irrigation and thus made to produce cotton. This is particularly true in the Matamoros district and the west coast areas. The rush for land is on. Farmers who a few years ago had no hope of owning or controlling land are now in possession of a considerable area. The returns from cotton are such that these farmers are able to borrow far beyond the expectation of a few years ago. From the standpoint of land that can be utilized for cotton production, if water is available, there seems to be enough to continue the expansion of cotton acreage for some time. Cotton acreage could be increased as much as 20 percent within the next few years.

The most important and limiting factor in the expansion of cotton production in Mexico is water. The government has constructed a number of dams and reservoirs throughout the cotton-growing areas but there are still opportunities for further construction. There is a definite limit to the amount of water available for storage in reservoirs. The rainfall over the whole of northern Mexico is relatively light and although a watershed may be large there is the problem of catching enough water to fill the reservoirs. In the past the Government has built dams only as the money has become available. Development of new works has been slow but if the Government were to change its policy and borrow money for irrigation expansion, several large projects might be opened in the next few years. The policy of paying for the facilities as they were built prevented the rapid expansion of reservoirs and irrigation works.

The development of pump irrigation will be an important factor in the water supply, especially in the west coast districts. Here credit has also played an important role. Without credit the work of drilling wells and the construction of surface ditches would be much below the present development. There is still room for considerable expansion of irrigation facilities in both the west coast and the Matamoros districts. This is also true to a lesser degree in other districts. While there is a limit to available land, irrigation facilities are the real controlling factor in most of the cotton-growing districts.

In districts where cotton growing is established, some further production may be expected as a result of increased yields per acre. A good deal of attention is being given to improved varieties. Those that normally give a high yield in the United States are becoming widespread throughout the Mexican cotton-growing districts. The losses that occur through insect damage are also being reduced by the application of insecticides identical to those used in the United States. Fertilizer is not an important factor at present but may in the future exert considerable influence on yields. In view of the changes that are taking place in cultural methods, selection of varieties,, and insect control, it is reasonable to expect yields to increase.

A great deal of the irrigated cotton area of Mexico does not get all the water it needs or does not get water at the proper time. This accounts in part for yields being lower than those of the irrigated areas in the United States. With better water use, however, yields could be increased in Mexico.

The ultimate position of Mexico as a cotton-exporting country depends in part on the domestic cotton spinning industry. At present this industry is consuming approximately 300,000 bales annually; the prospects for substantially increased consumption are not very great. The available surplus for export will therefore be that portion of the production in excess of approximately 300,000 bales. If Mexico should continue to produce approximately 1,000,000 bales a year, about 700,000 bales will be available for export annually.

The price is going to be another factor in future expansion. If returns for cotton continue to be profitable, new areas will be opened. Production will expand and exports will increase. Every bale of Mexican cotton sold abroad will be sold in competition with United States cotton.

If, on the other hand, prices should decline, the rate of expansion will slow up. Should prices drop drastically, the exportable surplus will decline, and acreage expansion would come to an end. However, much of the expansion of the last 3 or 4 years occurred during a period in which the price of cotton was 30 cents or less per pound.

